Use of TiO_2 residues from the sulfate process

The invention relates to the use of TiO_2 residues from the sulfate process.

The use of residues from TiO_2 production (TiO_2 residues) in the metallurgical industry is known in principle. For example, DE 4419816 C1 describes a titanium-containing additive comprising TiO_2 residues and further substances. DE 19705996 C2 describes a process for the production of an additive comprising TiO_2. In that process, a mixture of TiO_2 residues and iron or iron compounds is subjected to heat treatment at from 200 to 1300°C. The laborious metering and mixing of the TiO_2 residues with the further constituents of the additive are disadvantageous.

DE 19830102 C1 describes the use of a fine-grained TiO_2-containing residual substance formed in the production of TiO_2 by the chloride process. A disadvantage of this teaching is that such fine-grained TiO_2-containing residual substances are not formed in the production of TiO_2 by the sulfate process and the teaching is therefore not applicable to TiO_2 residues from the sulfate process.

The object of the invention is to overcome the disadvantages of the prior art and, in particular, to indicate a simple use of TiO_2 residues from the production of TiO_2 by the sulfate process.

The object is achieved by the use of TiO_2 residues from the sulfate process in metallurgical processes or as a constituent of refractory materials, the TiO_2 residues being subjected to heat treatment and used without being mixed further with other substances.

Surprisingly, it has been found that, in metallurgical processes or as a constituent of refractory materials, the TiO_2 residues from the sulfate process develop, *per se*, the same desired action as the mixtures of TiO_2 residues and other substances provided hitherto. The TiO_2 residues can

be used in the heat treatment in the unwashed state or in the washed and neutralised state.

The heat treatment of the TiO_2 residues is preferably carried out at from 100 to 1300°C. The TiO_2 residues can be in powder form or in the form of moulded bodies (obtained, for example, by sintering, pelletisation, briquetting or compression).

The heat-treated (dried) TiO_2 residues preferably comprise the following substances as the main constituent (amounts are in wt.%):

TiO_2	from 35 to 70
SiO_2	from 5 to 40
Iron compounds	from 2 to 15
MgO	from 1 to 15
CaO	from 0.5 to 15

Alternatively, the heat-treated (dried) TiO_2 residues can comprise the following main constituents, calculated as oxides (amounts are in wt.%):

TiO_2	from 20 to 80
SiO_2	from 2 to 30
Al_2O_3	from 0 to 15
Fe_2O_3	from 0 to 15
MgO	from 1 to 15
CaO	from 0 to 15.

In a preferred use, the heat-treated TiO_2 residues are injected into a metallurgical furnace, for example a blast furnace or electrosmelting furnace or cupola. This results in an increase in the durability of the refractory furnace lining. The TiO_2 residues are further used in tap hole masses and other refractory materials.

The subject-matter of the invention is explained in greater detail by means of the following example.

Example 1: Working-up of a TiO_2 residue from the sulfate process for use in a metallurgical furnace

100 t of pressure filter discharge (digestion residue), which formed during digestion in the production of TiO_2 by the sulfate process and had a solids content of 75 wt.% with a TiO_2 content of 53 wt.% (based on the solids content), were treated in a rotary furnace at an inlet temperature of 650°C. The finely divided product which was obtained had a residual moisture content of 0.5 wt.%. The product exhibited very good pourability and could very readily be injected into a metallurgical furnace (in this case a blast furnace) by means of pneumatic feeding.

The product had the following composition (in wt.%):

TiO_2	53
Fe_2O_3	5.9
SiO_2	27.8
Al_2O_3	6.1
MgO	2.4
CaO	4.2

Patent Claims

1. Use of TiO_2 residues from the sulfate process in metallurgical processes or as a constituent of refractory materials, characterised in that the TiO_2 residues are subjected to heat treatment and used without being mixed further with other substances.

2. Use according to claim 1, characterised in that the TiO_2 residues are subjected to heat treatment at from 100 to 1300°C.

3. Use according to claim 1 or 2, characterised in that the TiO_2 residues are in powder form or in the form of moulded bodies.

4. Use according to any one of claims 1 to 3, characterised in that the TiO_2 residues comprise the following substances as the main constituent (amounts are in wt.%):

TiO_2	from 35 to 70
SiO_2	from 5 to 40
Iron compounds	from 2 to 15
MgO	from 1 to 15
CaO	from 0.5 to 15.

5. Use according to any one of claims 1 to 3, characterised in that the TiO_2 residues comprise the following main constituents, calculated as oxides (amounts are in wt.%):

TiO_2	from 20 to 80
SiO_2	from 2 to 30
Al_2O_3	from 0 to 15
Fe_2O_3	from 0 to 15
MgO	from 1 to 15
CaO	from 0 to 15.

6. Use according to any one of claims 1 to 5, characterised in that the dried TiO_2 residues are injected into a metallurgical furnace.

7. Use according to any one of claims 1 to 5, characterised in that the dried TiO_2 residues are used in a tap hole mass.